

PATENT COOPERATION TREATY

CONFIRMATION

From the:
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

Reed
1 Oct 04


PCT

NOTIFICATION OF TRANSMITTAL OF
INTERNATIONAL PRELIMINARY EXAMINATION
REPORT

(PCT Rule 71.1)

To: Lawrence Y.D. HO 30 Bideford Road #07-02/03 Thongsia Building SINGAPORE 229922		Date of mailing day/month/year 27 SEP 2004
Applicant's or agent's file reference 1007.P056PCT/KJT/ayu		IMPORTANT NOTIFICATION
International Application No. PCT/SG2003/000204	International Filing Date 29 August 2003	Priority Date 29 October 2002
Applicant ADVANCED SYSTEMS AUTOMATION LIMITED et al		

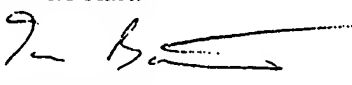
1.	The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2.	A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3.	Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translations to those Offices.
4.	REMINDER The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301). Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned. For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide

Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929	Authorized officer  I.A.BARRETT Telephone No. (02) 6283 2189
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PATENT COOPERATION TREATY
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 1007.P056PCT/KJT/ayu	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International Application No. PCT/SG2003/000204	International Filing Date (day/month/year) 29 August 2003	Priority Date (day/month/year) 29 October 2002
International Patent Classification (IPC) or national classification and IPC Int. Cl. ⁷ H01L 21/50, 21/304		
Applicant ADVANCED SYSTEMS AUTOMATION LIMITED et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet. <input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT). These annexes consist of a total of 6 sheet(s).
3. This report contains indications relating to the following items: I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

Date of submission of the demand 5 March 2004	Date of completion of the report 22 September 2004
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer  I.A. BARRETT Telephone No. (02) 6283 2189

I. Basis of the report**1. With regard to the elements of the international application:***

- ☐ the international application as originally filed.
- ☒ the description, pages 1-15, as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☒ the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages 16-21, received on 20 September 2004 with the letter of 20 September 2004
- ☒ the drawings, pages 1-12, as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , received on with the letter of

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims 1-30	YES
	Claims	NO
Inventive step (IS)	Claims 1-30	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-30	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)

The prior art cited discloses singulation of packaged semiconductor devices where a packaged substrate is moved from a loading location to a cutting location, cutting is performed in a first, then a second, direction, followed by transporting from the cutting location to an unloading location where singulated packages are unloaded. This is different from the invention of independent claims 1 and 17. Claims 1 and 17 require the packaged substrate to be partially cut while mounted on a first movable mount, then transferred to a second movable mount where further cutting produces singulated packages, which are then unloaded at an unloading location. The prior art does not disclose transferring the packaged substrate from a first to a second mount between cutting steps. The attorneys letter of 13 July 2004 has asserted that this allows concurrent operations to be performed on two moulded substrates, with cutting performed at a common location. It appears that it would require an inventive step over the prior art to arrive at the invention claimed. Claims 1-30 are considered novel and inventive.

1. A handler for singulating at least one packaged substrate into a plurality of packaged semiconductor devices by using a water jet, the handler comprising:

a first movable mount for moving between a loading location and a cutting location, the first movable mount adapted to receive the at least one packaged substrate at the loading location, the first movable mount for transporting the at least one packaged substrate from the loading location to the cutting location, and the first movable mount adapted to secure the at least one packaged substrate thereon while the at least one packaged substrate is at least partially cut at the cutting location; and

a second movable mount for moving between the cutting location and an unloading location, the second movable mount adapted to receive the at least one packaged substrate that is at least partially cut at the cutting location, the second movable mount for securing the at least one packaged substrate thereon while the at least one packaged substrate is at least partially cut at the cutting location to produce at least some of the plurality of packaged semiconductor devices, and the second movable mount for transporting the at least some of the plurality of packaged semiconductor devices from the cutting location to the unloading location.

2. A handler in accordance with claim 1, further comprising at least one water jet as the cutting tool disposed at the cutting location, the at least one cutting tool suitably adapted for cutting the at least one packaged substrate.

3. A handler in accordance with claim 2, wherein the at least one water jet is from at least one water jet nozzle.

4. A handler in accordance with claim 3, wherein the at least one water jet includes abrasive material.
5. A handler in accordance with claim 4, further comprising a distance detector mounted proximal the at least one water jet nozzle, the distance detector for detecting the distance between the at least one water jet nozzle and the at least one packaged substrate when cutting the at least one packaged substrate with the at least one water jet, and the distance detector for providing a detected distance.
6. A handler in accordance with claim 5 further comprising a movable mount for mounting the water jet thereto, the movable mount being coupled to receive an adjusted distance, the movable mount for maintaining a predetermined distance between the water jet and the at least one packaged substrate when cutting the at least one packaged substrate with the water jet, in accordance with the adjusted distance.
7. A handler in accordance with claim 1 further comprising at least one transport guide that extends from the loading location, through the cutting location, and to the unloading section, wherein at least the first movable mount is movably coupled to the at least one transport guide.
8. A handler in accordance with claim 7 wherein the at least one transport guide comprises at least a pair of rails, and wherein at least the first movable mount is movably coupled to the pair of rails.
9. A handler in accordance with claim 8 wherein at least the second movable mount is movably coupled to the pair of rails.

10. A handler in accordance with claim 9 wherein the pair of rails are substantially linear and extend substantially parallel to each other from the loading location, through the cutting location, and to the unloading location.

11. A handler in accordance with claim 1 wherein the first movable mount comprises a rotatable vacuum chuck for securing the at least one packaged substrate thereto.

12. A handler in accordance with claim 11 wherein the second movable mount comprises a rotatable vacuum chuck for securing the at least one packaged substrate thereto.

13. A handler in accordance with claim 1, further comprising a movably mounted image capture device directed at the loading location for capturing at least one image of the at least one packaged substrate on the first movable mount, when the first movable mount is at the loading location.

14. A handler in accordance with claim 1, further comprising a second image capture device directed at the cutting location for capturing at least one image of the at least one packaged substrate on the second movable mount, when the second movable mount is at the cutting location.

15. A handler in accordance with claim 1, further comprising a transfer means for transferring the at least one packaged substrate from the first moveable mount to the second movable mount.

16. A handler in accordance with claim 1, wherein the transfer means comprises at least one pick and place assembly mounted to operate at the cutting location.

17. A method for handling at least one packaged substrate for singulation into a plurality of packaged semiconductor devices by using a water jet, the method comprising:

a) providing:

a first movable mount for moving between a loading location and a cutting location; and

a second movable mount for moving between the cutting location and an unloading location,

b) moving the first movable mount from the loading location to the cutting location with the at least one packaged substrate disposed thereon;

c) cutting the at least one packaged substrate in a first reference direction at the cutting location;

d) transferring the at least one packaged substrate from the first movable mount to the second movable mount;

e) cutting the at least one packaged substrate in a second reference direction, different from the first reference direction, at the cutting location, to produce the plurality of packaged semiconductor devices; and

f) moving the second movable mount from the cutting location to the unloading location.

18. A method in accordance with claim 17 further comprising, prior to (b), loading the at least one packaged substrate on the first movable mount.

19. A method in accordance with claim 17 further comprising, after (f), unloading the plurality of packaged semiconductor devices on the second movable mount.

20. A method in accordance with claim 17, wherein step (a) further comprises providing a water jet for cutting the at least one packaged substrate in (c).
21. A method in accordance with claim 17, wherein (a) further comprises providing a water jet for cutting the at least one packaged substrate in (e).
22. A method in accordance with claim 21 further comprising, after (b) but before (c), aligning the at least one packaged substrate with the water jet.
23. A method in accordance with claim 21 further comprising, after (d) but before (e), aligning the at least one packaged substrate with the water jet.
24. A method in accordance with claim 17 wherein (b) further comprises moving the second movable mount from the cutting location to the unloading location with at least another previously singulated packaged substrate disposed thereon.
25. A method in accordance with claim 24 wherein (c) further comprises unloading the at least another previously singulated packaged substrate at the unloading location.
26. A method in accordance with claim 20 wherein (c) further comprises moving the first movable mount in the first reference direction.
27. A method in accordance with claim 20 wherein (c) further comprises moving the water jet in the second reference direction.

28. A method in accordance with claim 21 wherein (e) further comprises moving the second movable mount in the first reference direction.

29. A method in accordance with claim 21 wherein (e) further comprises moving the water jet in the second reference direction.

30. A method in accordance with claim 17, wherein (d) comprises picking the at least one packaged substrate off the first movable mount, moving the first movable mount from the cutting location to the loading location, moving the second movable mount from the unloading location to the cutting location, and placing the at least one packaged substrate on the second movable mount.